WATER GATE MC

Decision Maker's Guide

A Complement to the User's Guide

© 2010 MegaSecur Environmental Security Inc. All rights reserved.

February 22, 2011 Edition

TABLE OF CONTENTS

Our expertise is undeniable

QUESTIONS MOST OFTEN ASKED BY OUR CUSTOMERS

- What happens if fragments in and on the water smash against the Water-Gate barrier? 2
- If a wall or a tree falls on the barrier during a flood, what solution do you propose? 2
- What skills are required for installation? Is training necessary? 2
- Can the Water-Gate system open up fast enough to stop waves? 3
- If the flood is a mudflow and huge rocks get dragged down, will the Water-Gate barrier withstand the flood? 3
- If the water barrier is left for several months or even several years in a stream, will it stay in place during that period? 3
- Will the barrier withstand parallel water flow? 4
- What about leaks from the Water-Gate system? 4
- Will the Water-Gate barrier withstand freeze-thaw cycles? 4

ESTIMATES AND TECHNICAL CHARTS

- Our Storage Bags 5
- Technical Specifications of Our Fabrics 6
- Size and Weight of Individual Barriers 7
- Size and Weight of Crated Barriers 8
- Calculation of Installation Time 9
- Estimating the Size of a Conservation Pool 10

OUR EXPERTISE IS UNDENIABLE

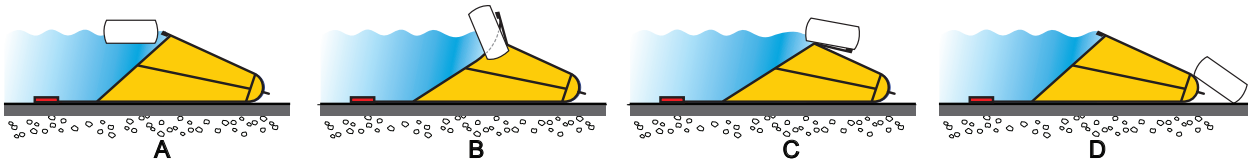
This complement to our User's Guide is intended as a help for the decision maker, buyer or engineer interested in purchasing one of our products. The Water-Gate water barrier was first marketed in 1998 and has continued to be in demand around the world since that time. MegaSecur has sold over 3000 water barriers in more than 25 countries. We've acquired solid expertise in the area of floods, underwater work and in several other fields as well, such as hydrology, hydroelectric dam raising, settling tanks, etc. Our customers are varied, but all are highly satisfied with our products.

QUESTIONS MOST OFTEN ASKED BY OUR CUSTOMERS

What happens if fragments in and on the water smash against the Water-Gate barrier?

Rigid systems are vulnerable and dangerous if they are hit by large fragments. Systems filled with water or air will deflate and lose their rigidity (hold) if fragments hit and damage their structure. As for sandbags, if they are pushed out of the way by large fragments this can create a large gap in the dam and flood control will be lost.

The Water-Gate water barrier has the amazing ability to hold back all fragments in the water due to its great flexibility. If one or more large objects are being projected at high speed against the barrier, be it from a parallel, sideways or perpendicular angle, the barrier will act like a spring. The object being thrust against the barrier will automatically be pushed away from the barrier with little risk of damaging it.



If there are fragments floating on the water, they will fold down the top of the barrier as they hit it, go over it and end up at the back of it. Should the barrier get hit very hard by a floating object, it could tear at the top. However, we are confident that it would hold out until the flood was contained.

If a wall or a tree falls on the barrier during a flood, what solution do you propose?

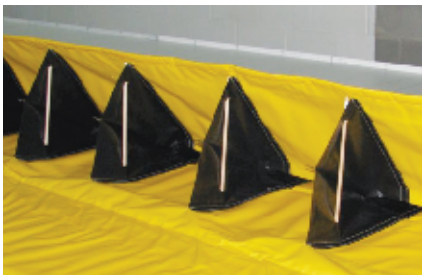
The water barrier will simply wrap itself around the object that fell on it and only a small amount of water will go over the barrier. All you have to do is remove the fallen object, and the barrier will regain its original position. The risk of tears from an object falling on the barrier is pretty low. Should there be a hole or a tear, it can easily be repaired by placing a piece of fabric inside the barrier. The fabric will adhere to the inside wall simply from the pressure of the water entering the barrier.

We believe that in the case of a heavy object falling, the Water-Gate barrier and sandbags would be the only flood control devices that would hold out.

What skills are required for installation? Is training necessary?

No particular skills are required. However, basic training is recommended. Installation is simple but does require a minimum of understanding. Our User's Manual explains all applications and shows how easy it is to install the water barrier. Chances are you will find everything you need to know in this manual. If you have any questions after going through it, a technician at MegaSecur will be happy to give you more information.

Can the Water-Gate system open up fast enough to stop waves?

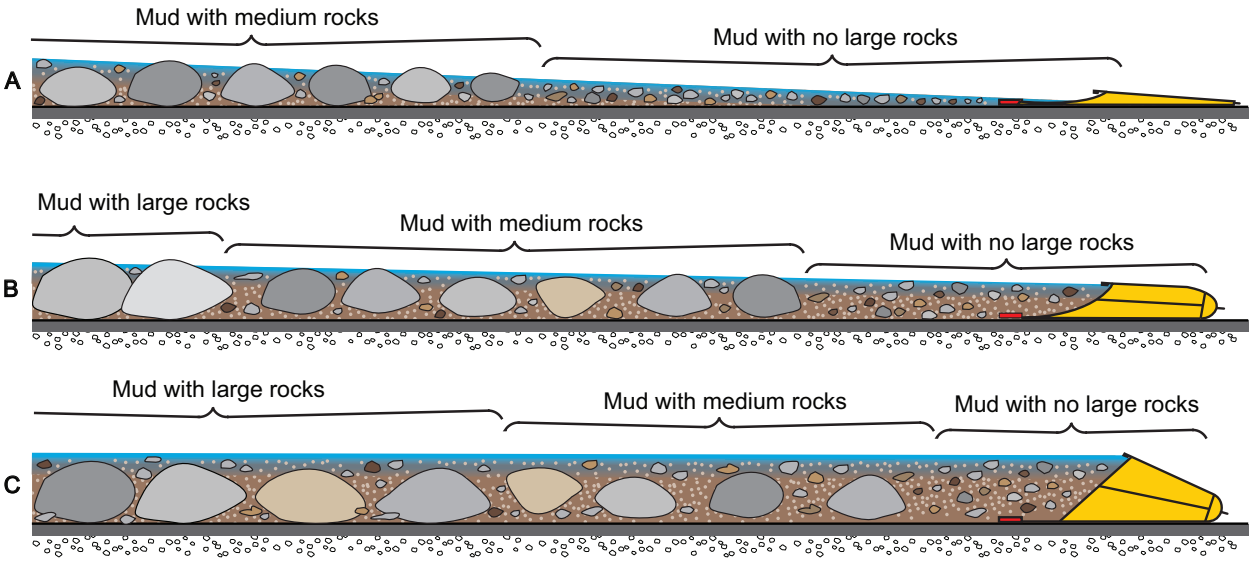


The Water-Gate water barrier will open at the same speed as that of any waves coming in. This means that regardless of the speed of the oncoming water, the barrier will open up like a parachute does in the wind. However, if a wave has white caps on top of it, the surplus of water will go over the barrier and will need to be pumped. To contain all types of waves, our water barriers can remain open. There are small holes at the base and at the top of the partitions in which stiff rods can be inserted to keep the barrier open at all times.

If the flood is a mudflow, and huge rocks get dragged down, will the Water-Gate barrier withstand the flood?

Yes, the water barrier can easily withstand the pressure from a mudflow. Careful trials were carried out with success. As mentioned in the User's Manual (Safety Standards), the water barrier is at least three times stronger than required. Given the fact that the density of thick mud is approximately 1.65, the safety margin is excellent.

As far as the presence of large rocks is concerned, we invite you to observe what usually takes place during a mudflow. At the beginning, there is a lot more water than mud and there are no rocks. Medium size rocks are typically found upstream and larger rocks are even further upstream. Based on our expertise, we know that the barrier will first fill up with relatively thin mud. Medium size rocks will arrive next.



The larger rocks will only be found at the end and will never reach the barrier. Because of this, a mudflow will not compromise the safety of the water barrier.

If the water barrier is left for several months or even several years in a stream, will it stay in place during that period?

Yes, the barrier will stay in place provided the water level is not much higher than the top of the barrier. (Refer to our Instruction Manual; WA Category – TWO PRINCIPLES OF ADHESION OF THE BARRIER INSTALLED IN STREAMS) Do not forget that the flow of a stream never remains the same due to alternate periods of drought and abundant rainfall. Also, in northern areas, the water barrier can be disturbed by moving ice.

Observation: If the water barrier remains in a stream for a month or longer, a light coat of silt will form inside, on the fabric at the bottom of the immersed barrier. After four months, only 50% of the fabric will remain visible due to the thickness of the silt.

Will the barrier withstand parallel water flow?

Parallel water flow is not a problem. In the example on the right, there was more water flowing than the barrier is intended to withstand, and the current was swift. In this same trial with lots of parallel flowing water, we attempted to damage the barrier with wood fragments. Our testing process was rigorous but did not result in any damage to the barrier.

What about leaks from the Water-Gate system?

No flood control system is 100% leak proof. Even if a system were completely watertight, there would be leaks through the ground from waste pipes, in addition to rainwater falling on the part of the ground that you are trying to protect.

Water leaking through the barrier generally flows under the barrier, between the bottom of the barrier and the ground underneath it. Leaks occur because of the unevenness of different surfaces. However, the more the Water-Gate barrier fills up with water, the more watertight it becomes.

If the water barrier is laid down on a regular asphalt surface, with 10 cm of retained water, the size of the leaks can be around 4 litres/min per linear metre. However, if the barrier retains 50 cm of water, only about 2 litres/minute per linear metre will leak from it.

Your emergency plan should definitely include pumps to remove any water leaking through the flood control barrier. We recommend using gas powered water pumps that do not depend on electrical power and to plan for leaks that may be greater than the amount of water expected to flow under the barrier.

Will the Water-Gate barrier withstand freeze-thaw cycles?

Our PVC fabric manufacturer warrants its product against cracking at a temperature of –30ºC, and the polyethylene partitions are guaranteed to withstand temperatures as low as –40º C.

The PVC fabric and polyethylene used to make our barriers are the same as those used for road transport and car shelters. They are very resistant to extreme temperatures and have proven their worth over several decades of freeze-thaw cycles.

The water barrier in the photograph on the right was placed in a stream at a temperature of –20ºC for a period of three days. A layer of ice formed on the inside, at the top of the PVC (yellow) fabric, but was very easy to remove by just tapping the barrier. The ice came unstuck, immediately floated to the top of the barrier, slid over it and ended up behind it. We were then able to dismantle the barrier in the same way as in summer, with the exception that the remaining water quickly formed into ice crystals, and the barrier became instantly dry and clean.

OUR STORAGE BAGS

Three types of storage bags are available depending on the barrier category and model.

The “drawstring” type is the most popular because it is easy to use and less expensive.
The “handbag” type provides quick access to the barrier and is easy to handle.
Finally, the “blanket” type bag is used for heavier barriers that may require handling by more than one person.

Model		WA-1525	WA-1550	WA-2130	WA-2150	WA-2825	WA-2835	WA-2850	WA-3930	WA-3950	WA-5030	WA-5050	WA-6030	WA-6050	WA-7830	WA-7850	WL-0630	WL-1430	WL-1450	WL-2030	WL-2050	WL-2630	WL-2650	WL-3950	WL-5050	WL-6050	WL-7850	Toute la catégorie WP
Storage bags	Drawstring bag	●		●		●																						●
	Handbag																●	●	●	●		●						
	Blanket		●		●		●	●	●	●	●	●	●	●	●	●					●		●	●	●	●	●	

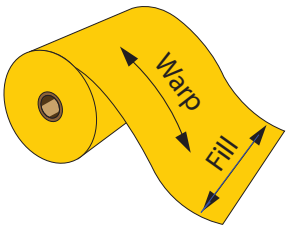
Drawstring bag

Handbag

Blanket

TECHNICAL SPECIFICATIONS OF OUR FABRICS

The technical specifications in the chart below are minimum requirements for all specified properties. These specifications enable us to guarantee our durability standards, which are three times higher than required. You have our assurance that in the majority of cases, our fabrics are much more resistant than the specifications outlined below.



PVC Fabric	For models WA -15, WA - 21, WA - 28, WL - 06, WL - 14, WL - 20 and WL26			For models WA - 39, WA - 50, WA - 60, WL - 39, WL - 50 and WL - 60		
Properties	**Minimum Specification**		****Certified**	**Minimum Specification**		****Certified**
Weight	**610 g/m ² - 18 oz yd ²**		yes	**750 g/m ² - 22 oz yd ²**		yes
Base Fabric	Woven polyester scrim		-	Woven polyester scrim		-
Tension resistance *	Warp 40 kg/cm 245 lbs/in	Fill*** 35 kg/cm 218 lbs/in	yes	Warp 55 kg/cm 310 lbs/in	Fill*** 50 kg/cm 275 lbs/in	yes
Tear resistance	Warp 32 kg 72 lbs	Fill*** 22 kg 49 lbs	yes	Warp 45 kg 100 lbs	Fill*** 35 kg 80 lbs	yes
Adhesion	Warp 1,5 kg/cm 8 lbs/in	Fill*** 1,5 kg/cm 8 lbs/in	yes	Warp 1,5 kg/cm lbs/in	Fill*** 1,5 kg/cm 8 lbs/in	yes
Heat resistance	-30º +70º C / - 22 º +160º F		yes	-30º +70º C / - 22º +160º F		yes
UV resistance	More than 80% strength retention after 2000 hours of exposure		no	More than 80% strength retention after 2000 hours of exposure		no
Flame resistance	Non applicable		no	Non applicable		no

Polyethylene woven fabric	For models WA-15, WA-21, WA-28 WL-06, WL -14, WL -20 et WL -26			For models WA-39, WA -50, WA -60 WL-39, WL -50 and WL- 60		
Properties	**Minimum Specification**		****Certified**	**Minimum Specification**		****Certified**
Weight	**200 g/m ² - 6 oz yd ²**		yes	**300 g/m ² - 9 oz**		yes
Base Fabric	100 % polyethylene			100 % polyethylene		
Tension resistance *	Warp 34 kg/cm 210 lbs/in	Fill*** 30 kg/cm 185 lbs/in	yes	Warp 80 kg/cm 490 lbs/in	Fill*** 50 kg/cm 320 lbs/in	yes
Tear resistance	Warp 31 kg 68 lbs	Fill*** 31 kg 68 lbs	yes	Warp 40 kg 88 lbs	Fill*** 40 kg 88 lbs	yes
Resistance to cold temperature	- 40º C / - 40º F		yes	- 40º C / - 40º F		yes
UV resistance	More than 80% strength retention after 2000 hours of exposure		no	More than 80% strength retention after 2000 hours of exposure		no
Flame resistance	Non applicable			Non applicable		

Lbs/in.= Pounds/inch = lbf yd ² = square yard g/m ² = GSM

* Tension resistance or grab or tensile

** Certified = tested according to recognized standards

*** Fill or Weft

SIZE AND WEIGHT OF INDIVIDUAL BARRIERS
(With storage bag)

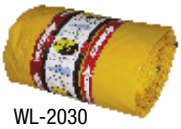
WA-2825

WA-2850

WA-6050

WL-0630

WL-1430


WL-2030

WL-2650

WL-3950

WP-2030

WP-2650

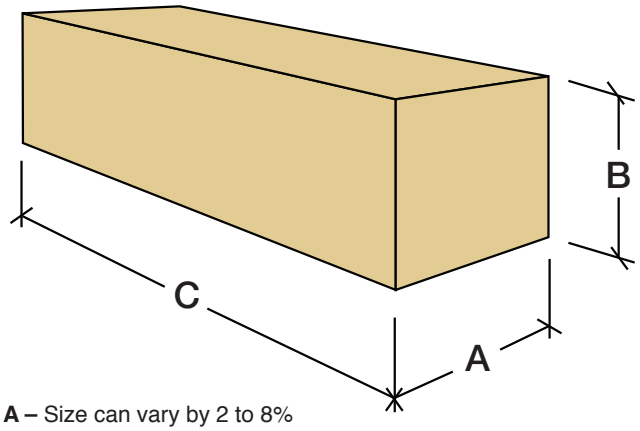
Item	Size of Product		Weight (barrier only)	
	Centimeters	Inches	Kilos	Pounds
WA-1525	35 x 35 x 46 h	14" x 14" x 18" h	12,9	28,4
WA-1550	43 x 43 x 46 h	17" x 17" x 18" h	24,9	54,8
WA-2130	41 x 41 x 52 h	16" x 16" x 20 ½" h	20,9	46
WA-2150	53 x 53 x 39 h	21" x 21" x 15 ½" h	34,5	76
WA-2825	35 x 35 x 58 h	14 " x 14" x 23 " h	26,4	58
WA-2835	51 x 61 x 35 h	20" x 24" x 14" h	36,4	80
WA-2850	63 x 58 x 46 h	25" x 23" x 18" h	51	111
WA-3930	63 x 94 x 43 h	25" x 37" x 17" h	72,7	160
WA-3950	76 x 94 x 51 h	30" x 37" x 20" h	121	267
WA-5030	71 x 127 x 46 h	28" x 50" x 18" h	92,3	203
WA-5050	79 x 127 x 53 h	31" x 50" x 21" h	153	336
WA-6030	84 x 145 x 43 h	33" x 57" x 17" h	110	242
WA-6050	92 x 145 x 51 h	36" x 57" x 20" h	182	400
WA-7830	89 x 203 x 48 h	35" x 80" x 19" h	198	435
WA-7850	114 x 203 x 61 h	45" x 80" x 24" h	357	785
WL-0630	40 x 38 x 26 h	16" x 15" x 10 ½" h	24,5	54
WL-1430	38 x 106 x 25 h	15" x 42" x 10" h	25,7	56,6
WL-1450	48 x 106 x 30 h	19" x 42" x 12" h	42,1	92,6
WL-2030	43 x 74 x 30 h	17" x 29" x 12" h	32,7	72
WL-2050	56 x 74 x 35 h	22" x 29" x 14" h	53,6	118
WL-2630	40 x 10 4 x 28 h	16" x 41" x 11" h	41,4	91
WL-2650	56 x 10 4 x 36 h	22" x 41" x 14" h	68,2	150
WL-3930	46 x 117 x 33 h	18" x 46" x 13" h	89	195
WL-3950	61 x 117 x 40 h	24" x 46" x 16" h	145	320
WL-5050	66 x 127 x 46 h	26" x 50" x 18" h	173	380
WL-6050	76 x 127 x 51 h	30" x 70" x 20" h	204	449
WL-7850	86 x 229 x 56 h	34" x 90" x 22" h	366	804
WP-1410	21 x 21 x 50 h	8¼"x 8¼"x 19 ½" h	3.2	7
WP-1415	24 x 24 x 50 h	9½"x 9½"x 19 ½" h	4.1	9
WP-14 30	33 x 33 x 51 h	13" x 13" x 20" h	7.4	16.3
WP-1450	41 x 41 x 51 h	16" x 16" x 20" h	12	26.5
WP-2010	23 x 23 x 49 h	9" x 9" x 19 ¼" h	5	10.9
WP-2015	27 x 27 x 49 h	10 ½"x10 ½"x19 ¼" h	6.7	14.8
WP-2030	34 x 34 x 49 h	13 ½"x13 ½"x19 ¼" h	16 .6	26.8
WP-2050	45 x 45 x 49 h	17 ½"x17 ½"x19 ¼" h	21 .1	42.8
WP-2610	24 x 24 x 64 h	9¼" x 9 ¼" x 25" h	8	15.2
WP-2615	28 x 28 x 64 h	11" x 11" x 25" h	11 .5	22
WP-2630	38 x 38 x 64 h	15"x 15" x 25" h	19	37.8
WP-2650	48 x 48 x 64 h	19"x 19" x 25" h	30 .7	62.4
Water-Plug	43 x 53 x 13 h	17" x 21" x 5" h	4.2	9.3

SIZE AND WEIGHT OF CRATED BARRIERS

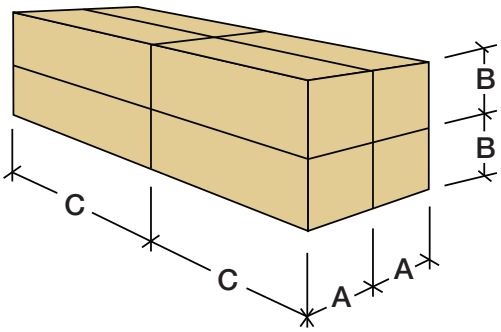
For the **WL** category only

To purchase crated barriers from MegaSecur, there is a cost over and beyond that quoted in our price list. These extra amounts are charged for two reasons: **1 –** Folding the barriers to be packed in crates requires more time for our employees than packing blanket type individual barriers. **2 –** The cost of the crate can vary substantially based on your needs. A crate can be made out of pallet wood, pressure treated wood panels, painted to your specifications or even be built from steel and assembled on wheels. It all depends on your requirements. This is why the cost of manufacturing the crate has to be estimated for each order.

As an example, the cost can represent 1 to 4% of the purchase price of the barrier when the crate is made out of wood.



A – Size can vary by 2 to 8%
B – Maximum size per crate
C – Size based on requirements



Because **A** varies little and **B** is a maximum size, cases can be piled up or placed one beside or behind the other, to fit the available space in your emergency response unit.

A few examples of the size of the areas required for crated barriers

Barrier model (water retention)	Outer dimension of crate			Number of barriers	Total length of protection	Total weight (barrier only)
	A	B	C			
WL - 0630 **15 cm / 6 in**	50 cm 20 in	60 cm 24 in	1 m / 3'-3"	**6**	55 m / 180 ft	150 kg / 330 lbs
			5 m / 16'-5"	**32**	292 m / 960 ft	790 kg / 1,750 lbs
WL - 1450 **35 cm / 14 in**	1,12 m 44 in	1,12 m 44 in	2,5 m / 8'-3"	**18**	274 m / 900 ft	760 kg / 1,670 lbs
			5 m / 16'-5"	**40**	609 m / 2000 ft	1,68 t / 1,85 tons
			13,6 m / 44'-7"	**120**	1 829 m / 6000 ft	5,1 t / 5,56 tons
WL - 2050 **50 cm / 20 in**	1 m 40 in	1,12 m 44 in	2,5 m / 8'-3"	**13**	198 m / 650 ft	700 kg / 1,550 lbs
			5 m / 16'-5"	**29**	442 m / 1450 ft	1,56 t / 1,71 tons
			13,6 m / 44'-7"	**89**	1 356 m / 4450 ft	4,8 t / 5,25 tons
WL - 2650 **67 cm / 26 ½ in**	1,20 m 47 in	1,12 m 44 in	2,5 m / 8'-3"	**13**	198 m / 650 ft	890 kg / 1,950 lbs
			5 m / 16'-5"	**28**	427 m / 1400 ft	1,91 t / 2,1 tons
			13,6 m / 44'-7"	**86**	1 310 m / 4300 ft	5,9 t / 6,5 tons
WL - 3950 **1 m / 39 in**	1,36 m 54 in	1,12 m 44 in	2,5 m / 8'-3"	**12**	183 m / 600 ft	1,75 t / 1,9 tons
			5 m / 16'-5"	**27**	410 m / 1350 ft	3,93 t / 4,3 tons
			13,6 m / 44'-7"	**83**	1 265 m / 4150 ft	13,3 t / 13,3 tons
WL - 5050 **1,3 m / 50 in**	1,70 m 67 in	1,12 m / 44 in	5 m / 16'-5"	**19**	290 m / 950 ft	3,24 t / 3,6 tons
		1,70 m / 67 in	13,6 m / 44'-7"	**86**	1 310 m / 4300 ft	14,7 t / 16,1 tons
WL - 6050 **1,5 m / 60 in**	2 m 79 in	1,12 m / 44 in	5 m / 16'-5"	**14**	213 m / 700 ft	2,8 t / 3,1 tons
		2 m / 79 in	13,6 m / 44'-7"	**82**	1 250 m / 4100 ft	16,2 t / 17,8 tons
WL - 7850 **2 m / 78 in**	2,55 m 100 in	1,12 m / 44 in	5 m / 16'-5"	**10**	152 m / 500 ft	3,6 t / 3,9 tons
		2,55 m / 100 in	13,6 m / 44'-7"	**68**	1 036 m / 3400 ft	24,3 t / 26,7 tons

CALCULATION OF INSTALLATION TIME

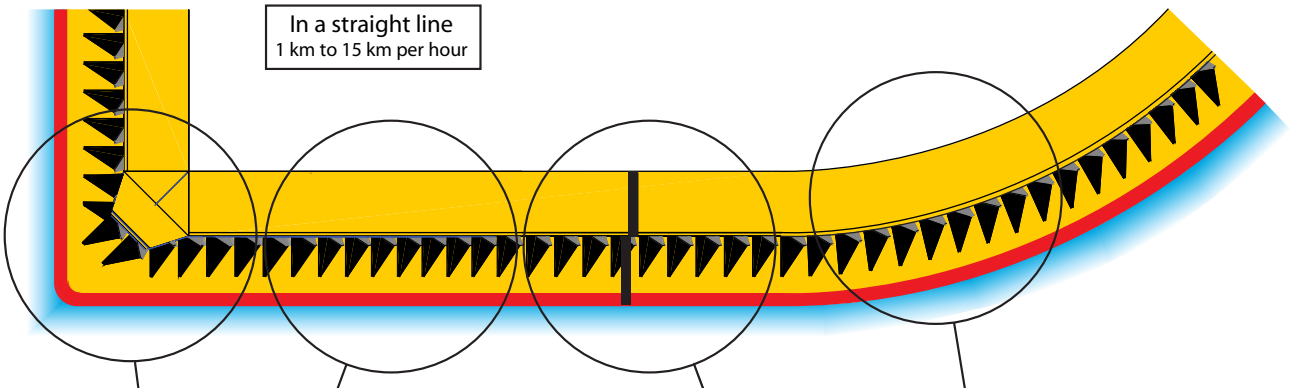
(For the **WL** category only)

Crated barrier: A Water-Gate water barrier stored in a crate can be deployed in a straight line at the speed of someone running a marathon, that is approximately 19 km/h (or one 15-m/50-foot barrier every 3 seconds), regardless of barrier width. However, if you have to bend or tie a barrier or make a corner at an angle, you will have to completely unroll the barrier or barriers and add the estimated time based on the barrier width and type of application. The diagram below provides a good estimate of how much time you will need, based on your application.

Deployment in a straight line can be done at the speed of a marathon runner.

Individual rolled barrier: To enable them to be carried to the location of the flood, these water barriers are wrapped in storage bags equipped with solid straps to facilitate handling by one or more people.

The table below shows the estimated time it takes to install a barrier with a length of 15 m/50 feet (except for the WL-06 model, which is 9.1 m/30 feet in length).



Barrier's size	Estimated time
WL-06	30 sec. / 1 pers.
WL-14, 20, 26	1.5 min. / 1 pers.
WL-39, 50	2 min. / 2 pers.
WL-60, 78	3 min. / 3 pers.

Unroll the barrier in a straight line

Barrier's size	Estimated time
WL-06	1 min. / 1 pers.
WL-14, 20, 26	3 min. / 2 pers.
WL-39, 50	3 min. / 3 pers.
WL-60, 78	4 min. / 3 pers.

Tying together two barriers

Barrier's size	Estimated time
WL-06	15 sec. / 1 pers.
WL-14, 20, 26	1 min. / 2 pers.
WL-39, 50	2 min. / 3 pers.
WL-60, 78	3 min. / 3 pers.

Making a corner for angles of 5° to 125°

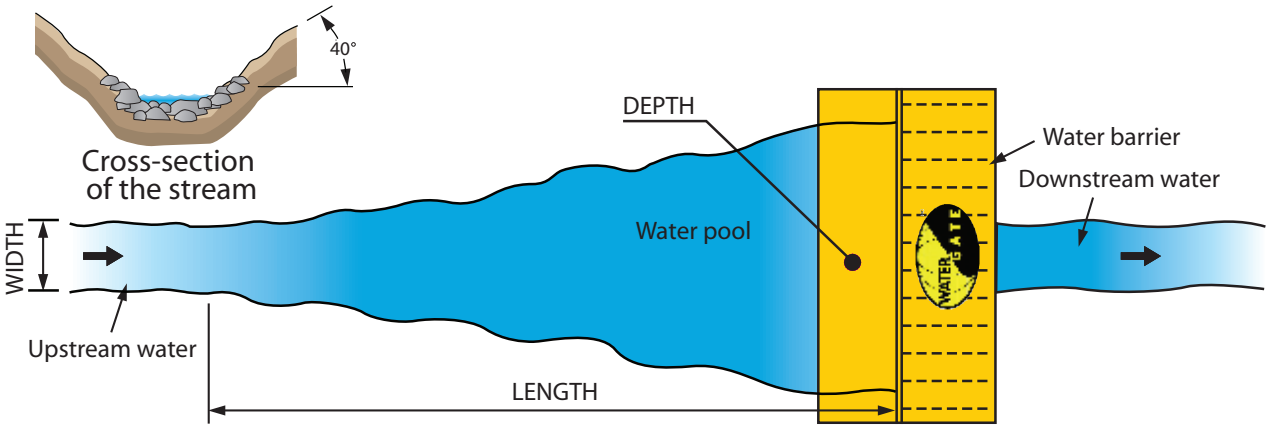
Barrier's size	Estimated time
WL-06	1 to 2 min. / 1 pers.
WL-14, 20, 26	1 to 4 min. / 2 pers.
WL-39, 50	2 to 5 min. / 3 pers.
WL-60, 78	3 to 7 min. / 3 pers.

Curving the barrier for angle greater than 5°

ESTIMATING THE SIZE OF A CONSERVATION POOL

(Mainly for the **WA** category)

This estimate of the conservation pool that the water barrier can contain is very basic, as streams are never straight and the banks are not well defined. However, we took into consideration the width the bottom of a stream that has a slight downward grade running at a 40º angle on each side. Keep in mind that the flow of water to the pool is constant and that the estimated size of the pool would only be exact if the stream stopped flowing and the water barrier was watertight.



Metric measures

Width of stream	Depth	Length	Size of pool in litres
1 m	35 cm (WA -15)	10 m	2 420 L
		30 m	7 280 L
		150 m	36 400 L
	53 cm (WA -21)	10 m	3 480 L
		30 m	10 450 L
		150 m	52 250 L
	71 cm (WA -28)	10 m	4 930 L
		30 m	14 800 L
		150 m	74 000 L
3 m	35 cm (WA -15)	10 m	6 620 L
		30 m	19 860 L
		150 m	99 300 L
	53 cm (WA -21)	10 m	8 900 L
		30 m	26 730 L
		150 m	133 650 L
	71 cm (WA -28)	10 m	11 770 L
		30 m	35 330 L
		150 m	176 650 L
5 m	35 cm (WA -15)	10 m	10 800 L
		30 m	32 450 L
		150 m	162 250 L
	53 cm (WA -21)	10 m	14 330 L
		30 m	43 000 L
		150 m	215 000 L
	71 cm (WA -28)	10 m	18 600 L
		30 m	55 800 L
		150 m	279 000 L

Imperial measures

Width of stream	Depth	Length	Size of pool in gallons	
			CAD	US
5 feet	15 inches (WA -15)	25 feet	590	700
		100 feet	2 360	2 830
		500 feet	11 820	14 180
	21 inches (WA -21)	25 feet	825	1 000
		100 feet	3 290	3 950
		500 feet	16 450	19 740
	28 inches (WA -28)	25 feet	1 130	1 350
		100 feet	4 520	5 4 20
		500 feet	22 600	27 100
10 feet	15 inches (WA -15)	25 feet	1 130	1 350
		100 feet	4 500	5 400
		500 feet	22 500	27 000
	21 inches (WA -21)	25 feet	1 520	1 820
		100 feet	6 060	7 270
		500 feet	30 300	36 300
	28 inches (WA -28)	25 feet	2 000	2 400
		100 feet	8 000	9 600
		500 feet	40 050	48 000
20 feet	15 inches (WA -15)	25 feet	2 200	2 640
		100 feet	8 800	10 560
		500 feet	44 000	52 800
	21 inches (WA -21)	25 feet	2 900	3 480
		100 feet	11 600	13 900
		500 feet	58 000	69 600
	28 inches (WA -28)	25 feet	3 750	4 500
		100 feet	14 980	17 900
		500 feet	74 900	89 800

Copyright:

This material constitutes a literary work protected by international copyright laws and is owned by MegaSecur Environmental Security Inc. The technical information set out in this manual cannot be used by other flood control product manufacturers. Reproduction in whole or in part without the express written permission of MegaSecur Environmental Security Inc. is strictly forbidden under penalty of law.

WWW.WATER-GATE.COM

Canada, Montreal. Tel. : (819) 751-0222

CE